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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 0416/RP	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/B2004/003877	International filing date (day/month/year) 25.11.2004 ✓	Priority date (day/month/year) 27.11.2003 ✓
International Patent Classification (IPC) or national classification and IPC B29C55/00, B29C55/02, B32B31/02		
Applicant NUOVA PANSAC S.P.A. et al. ✓		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet. ✓</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:</p> <p style="margin-left: 20px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 20px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand 02.08.2005 ✓	Date of completion of this report 16.02.2006	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Attalla, G Telephone No. +49 89 2399-6004 	

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International application No.
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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

2, 3, 5-7	as originally filed
1, 4	received on 05.08.2005 with letter of 02.08.2005

Claims, Numbers

1-11	received on 05.08.2005 with letter of 02.08.2005
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Drawings, Sheets

1/1	as originally filed
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- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-10
	No: Claims	11
Inventive step (IS)	Yes: Claims	1-9
	No: Claims	10,11
Industrial applicability (IA)	Yes: Claims	1-11
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

1. The application does not meet the requirements of Art. 33(2) PCT because the subject matter of claim 11 is not novel.

1.1 Document WO-A-0132116 (D1) discloses the use of a mixture of olefins, styrenic thermoplastic elastomers and filler to produce breathable elastic film (cf. D1, claims 1 to 5). D1, in claim 14, discloses concentration ranges of styrenic thermoplastic elastomer, filler and polyolefin which overlap the corresponding ranges disclosed in claim 11 of the present application. Therefore also the subject matter of this claim is not novel over D1.

2. The application does not meet the requirements of Art. 33(3) PCT because the subject matter of claim 10 does not involve an inventive step.

2.1 Document EP-B-1226013 (D2) discloses a plant suitable for producing a breathable elastomeric polyolefin film comprising in succession (cf. D2, claim 3 and fig. 1) a bubble extruder (1), a calender for squeezing the tubular film (2) in order to obtain two superposed layers, means for heating the squeezed tubular film (3,4), a calender to press the film (5) in order to join the two original layers together, means for cooling the film (5), means for stretching the film transversally and/or longitudinally (6,8) and a reeling machine (9) for winding the film to a roll.

Stabilisation (or stress relaxation) of a stretched film is a conventional operation in stretch film manufacturing which, moreover, is normally performed in the same stretching apparatus (in fact the applicant has indicated in the original application the means for stabilisation with the same numerals 6 and 8 as the means for stretching).

Therefore means for stretch stabilisation of the film are considered to be implicitly present in the apparatus disclosed in D1.

The apparatus of claim 10 differs from that of D1 for additionally having means for coupling the extruded film to a separating material.

The additional means solve the problem to avoid that successive layers of rolled film stick together and the film is damaged upon unwinding (cf. description, page 6, line 22-23). The use of a release film and of the means to wind said release film as interlayer together with the extruded film, in order to solve the above problem, is well known in the art (cf. e.g. WO-

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A-9962695 (D3), fig. 1; page 2, lines 18-29).

For this reasons to the subject matter of claim 10 cannot be recognised an inventive step.

3. Document D2 is the closest state of the art for the method of claim 1. The subject matter of claim 1 differs from D2 for the addition of a styrenic thermoplastic elastomer to the mixture of polyolefin and filler. It is believable that the addition of the elastomer avoids rupture of the film when adapted to the surface to be covered (cf. description, page 1, line 20-21). The use of a styrenic thermoplastic elastomer in a process of the type disclosed in D2 is neither known nor suggested in the available prior art. Therefore the subject matter of claim 1 is considered to fulfil the requirements of Art. 33 PCT.

4. Claims 2 to 9 are dependent upon claim 1. Consequently their subject matter also meets the requirements of Art. 33 PCT.

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PROCESS AND PLANT FOR MAKING A BREATHABLE, ELASTIC POLYOLEFIN FILM

This invention relates to a process for preparing a breathable elastic polyolefin film, a plant for implementing such process and the use of a mixture of polyolefins and thermoplastic elastomers for making a breathable elastic film.

Breathable polyolefin films are used in various technical fields, particularly for making products designed to be impervious to liquids while allowing air and vapor to pass therethrough.

From patent EP-B1-1 226 013, in the name of the applicant hereof, to which reference is made for a better understanding of the prior art, a process is known for making breathable polyolefin films by transversely and/or longitudinally stretching a polyolefin film, added with CaCO_3 fillers or equivalent materials.

According to the teaching of patent EP-B1-1 226 013, the polyolefin film to be stretched is obtained from a process which includes the steps of: producing a tubular by blow extrusion molding, squeezing the tubular to obtain two superimposed layers, heating the two superimposed layers to the softening point, pressing the two layers together to strongly join them and cooling the film thus obtained.

The film obtained by this process has the advantage of allowing higher film stretching rates and ratios, without increasing the risk of generating microholes, which might affect the liquid-imperviousness properties of the film.

The breathable polyolefin films that result from the process of patent EP-B1-1 226 013 have further drawbacks.

Particularly, the film may not be easily adapted to the surface to be covered, without risking the rupture thereof, while providing an adequate liquid-tightness.

The object of this invention is to provide a solution to prior art problems and particularly to the above mentioned problem.

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In a possible embodiment of the process, the weight percentages are substantially as follows:

27% olefins, 27% styrenic thermoplastic elastomer and 46% fillers.

This mixture is blow ~~molded~~ ^{EXTRUDED} by means of a round head extruder 1, thereby obtaining a tubular 10.

The temperature of the tubular 10 that is fed by the extruder 1 is of 150 to 230°C and preferably of 170 to 190°C.

The blowing ratio of the tubular 10 may be of 1:2 to 1:4 and preferably of 1:3.

The blow-extrusion ~~molded~~ tubular 10 is further calendered.

Particularly, the tubular 10 is fed, at a temperature of about 80 to 120°C, and more preferably of about 100°C, into a first calender 2, in which it is pressed and extended until it assumes a web shape 11, formed by two superimposed layers, whose width is half the circumference of the tubular and whose thickness is twice the thickness of the tubular.

The provision of two superimposed layers reduces the risk that, during the subsequent stretching step, the film may be damaged, i.e. that it may have areas with an imperfect liquid imperviousness.

In fact, the possibility that the film may be torn at the same position on both layers is extremely rare.

The calender 2 which is used to stretch-thin the tubular 10 has a pair of mated smooth rollers, the former being made of chromium plated steel and the latter being made of rubber with a hardness of 60 to 80 shores: the pressure exerted by the calendar roller 2 on the compressed tubular 10 is of 5 to 10 kg/cm².

After being flattened, the film 11 is heated to the softening point.

This temperature depends on the type of extruded mixture, and may be indicatively of 80 to 130°C, more preferably of about 100°C.

Such heating process assists removal of moisture or low-evaporation point additives in the extrusion mixture.

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AMENDED CLAIMS

[received by the International Bureau on 22nd April 2005 (22.04.2005);
original claims 1-13 replaced by new claims 1-11]

+ STATEMENT

1. A process for preparing breathable, elastic polyolefin films, including the steps of:
~~blow molding~~ **EXTRUDING** a mixture of olefins, styrenic thermoplastic elastomers and filler to facilitate the generation of porosity by stretching;
 - squeezing the tubular to obtain a flat film composed of two superposed layers;
 - heating the flat film to the softening point;
 - pressing the flat film in order to join the two original layers together;
 - cooling the flat film to a temperature of 8 to 30°C;
 - stretching the film in the transverse and/or longitudinal directions to make it breathable.
2. A process as claimed in claim 1, further comprising the steps of:
 - coupling a separating material to the breathable elastic film;
 - winding the film coupled with the separating material, into a roll.
3. A process as claimed in claim 1 or 2, wherein said mixture comprises 30% to 70% by weight fillers, 10% to 40% by weight styrenic thermoplastic elastomers and 10% to 50% by weight olefins.
4. A process as claimed in claim 1, 2 or 3, wherein said separating material has a continuous structure.
5. A process as claimed in claim 4, wherein said separating material is a paper or nonwoven fabric film.
6. A process as claimed in claim 5, wherein said paper or nonwoven fabric film is coupled to said extruded film by an adhesive.
7. A process as claimed in claim 5, wherein said paper or nonwoven fabric film is coupled to said extruded film (11) without using adhesives.

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8. A process as claimed in claim 1, 2 or 3, wherein said separating layer has a discontinuous structure.
9. A process as claimed in claim 8, wherein said separating layer is made of a powdered material.
10. A plant for producing a breathable elastomeric polyolefin film, including, in succession:
- a ~~blow molding~~ extruder (1) for extruding a tubular (11);
 - a calender (2) for squeezing the extruded tubular (11) fed from the blow molding extruder in order to obtain two superposed layers;
 - means (3, 4) for heating the squeezed extruded tubular film to the softening point;
 - a calender (5) to press the film that was previously heated to the softening point in order to join the two original layers together;
 - means (5) for cooling the compressed film to a temperature of 8 to 30°C;
 - means (6, 8) for stretching the film (11) in the transverse and/or longitudinal directions;
 - means for stretch stabilization by cooling the extruded film (11);
 - means (12, 13, 14) for coupling the extruded film (11) to a separating material;
 - a reeling machine (9) for winding the film (11) coupled to said separating material into a roll (18).
11. A use of a mixture of olefins, styrenic thermoplastic elastomers and filler to produce a breathable elastic film wherein the amount of styrenic thermoplastic elastomers is of 20% to 30% by weight, the amount of filler is of 30% to 70% by weight and the amount of olefins is of 27% to 34% by weight.